

CLAIMS

What is claimed is:

1. A process for making a porous catalyst, comprising
 - a) providing an aqueous solution containing a nanoparticle precursor;
 - 5 b) forming a composition containing nanoparticles;
 - c) adding a first catalytic component or precursor thereof and a pore-forming agent to the composition containing nanoparticles and allowing the first catalytic component, the pore-forming agent, and the nanoparticles form an organic-inorganic structure;
 - d) removing water from the organic-inorganic structure; and
 - 10 e) removing the pore-forming agent from the organic-inorganic structure so as to yield a porous catalyst.
2. The process according to claim 1 wherein step c) includes adding a dissolved salt of a first catalytic component.
3. The process according to claim 1 wherein the pore-forming agent is a cationic surfactant.
- 15 4. The process according to claim 1 wherein steps b) and c) are concurrent.
5. The process according to claim 1 wherein the nanoparticles are nanoparticles of a metal or metal oxide.
6. The process according to claim 1, further including the step of aging the organic-inorganic structure.
- 20 7. The process according to claim 1 wherein steps a) through c) are carried out such that the organic-inorganic structure is a gel-network.
8. The process according to claim 1 wherein step c) is carried out such that the porous catalyst is an aerogel or a xerogel.
9. The process according to claim 1 wherein the porous catalyst comprises nanoparticles in a
25 coating of a first catalytic component wherein the surface density of the first catalytic component is greater than the monolayer surface density for the material comprising the first catalytic component.
10. The process according to claim 1 wherein the porous catalyst comprises nanoparticles in a coating of a first catalytic component wherein the surface density of the first catalytic component is greater than 4 molecules per nm².
- 30 11. The process according to claim 1 wherein the first catalytic component is non-crystalline in the porous catalyst.
12. The process according to claim 1 wherein the first catalytic component is at least partially polymerized in the porous catalyst.
13. A catalytic composition, comprising:
35 nanoparticles comprising a support material;

an amount of a catalytically active material surrounding said nanoparticles, said catalytically active material being at least partially polymerized.

14. The composition according to claim 13 wherein the surface density of the catalytically active material is greater than the monolayer surface density for the material comprising the catalytically active material.

15. A method for catalyzing the reaction of a first stream to form a second stream, comprising:

- a) providing a porous catalyst comprising nanoparticles in a coating of a first catalytic component wherein the surface density of the first catalytic component is greater than the monolayer surface density for the material comprising the first catalytic component;
- b) contacting the porous catalyst with the first stream under reaction-promoting conditions.

16. The method according to claim 15 wherein the first catalytic component is at least partially polymerized in the porous catalyst.

17. The process according to claim 15 wherein the porous catalyst comprises nanoparticles in a coating of a first catalytic component wherein the surface density of the first catalytic component is greater than 4 molecules per nm^2 .

18. The process according to claim 15 wherein the first catalytic component is non-crystalline in the porous catalyst.